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Economics of Beef Cow Herds in Northeastern Minnesota

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ECONOMICS OF BEEF COW HERDS IN NORTHEASTERN MINNESOTA

A. R. Wells, S. A. Engene, and T. R. Nodland

Introduction

Relatively favorable off-farm employment opportunities and higher beef prices have caused many farmers in Northeastern Minnesota to consider adding beef cows as an enterprise on their farms. This report contains information that will be helpful in answering questions about the economics of maintaining a beef cow herd as an enterprise for part-time as well as full-time farmers. It includes information on: (1) average costs and returns, (2) management practices, and (3) feed, buildings, equipment, and labor requirements.

Data presented in this report are based on records obtained from 94 farmers with beef cow herds in Northeastern Minnesota in 1964. The owners of large beef herds were located with the assistance of the county agents and vocational agriculture instructors in the area. As many as possible of these farmers were interviewed. Each of these farmers was then asked to identify the nearest owners of small and of medium-sized herds. These interviews provided information on the operations of 32 herds with 16 to 40 cows, 32 herds with 41 to 70 cows, and 30 herds with more than 70 cows.

Characteristics of the Sample

The beef cow herd was relatively new on most farms that were surveyed. About one-third of the farmers had had beef cow herds for less than five years, another one-third for five to ten years, and the remaining one-third for ten years or more. In general, farmers who had been in the beef cow business for

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longer periods of time had the larger herds. Since some of these farmers had had limited experience with beef cows, it is probable that the average efficiency, especially for the small herds, will increase a little above that shown in this study.

More than two-fifths of the farmers were part-time farmers (table 1). Thirty-eight of the part-time farmers worked off the farm, while four were semi-retired. The amount of time these farmers worked off the farm varied from two or three hours per day to eight hours per day. Thus, in some cases, part-time farmers had relatively little labor available for farm work.

Table 1. Type of farm operator according to size of the beef cow herd.

Type of operator	Small herds	Medium herds	Large herds	All herds
	(number of herds)			
Part-time	19	18	5	42
Full-time	13	14	25	52

Beef cow herds were the only source of farm income on 29 farms; 22 of these 29 farms had medium or large herds (table 2). On the seven farms with small beef cow herds and no other source of farm income, farmers supplemented their incomes by off-farm employment or retirement benefits. Beef cows provided the major, but not the sole, source of income on another 25 farms.

Table 2. Percent of gross farm income from the beef cow herd, according to herd size.

Percent of gross farm income	Small herds	Medium herds	Large herds	All herds
	(number of herds)			
100	7	12	10	29
75 - 99	1	4	5	10
50 - 74	4	5	6	15
25 - 49	8	8	8	24
0 - 24	12	3	1	16

The beef herd was the most important source of farm income on 56 of these farms (table 3). Some other enterprise produced more income than the beef cow herd on 38 farms. Dairying was most important on 11 of these farms. On another 24 farms, feeder cattle, hogs, and cash grain were the most important sources of farm income.

Table 3. Major enterprise on farm according to herd size.*

Major enterprise	Small herds	Medium herds	Large herds	All herds
	(number of herds)			
Beef cow herd	13	22	21	56
Dairy	9	-	2	11
Feeder cattle	2	4	3	9
Hogs	4	3	1	8
Cash grain	4	1	2	7
Other**	-	2	1	3

* Major enterprise was that enterprise producing the largest percentage of gross farm income.

** One sheep, two specialty crops.

Management Practices

Nearly three-fifths (55) of the farmers turned bulls in with the cow herd in July, resulting in most of the calves being born the following April. They chose April as the calving month for two reasons: first, the weather usually was warm enough for calves to be born outside without much danger of freezing; second, the calves were large enough at pasture time to utilize the increased milk flow of cows.

The second most popular practice was to breed cows to calve after April. Twenty-five farmers followed this practice. Many of these farmers provided no shelter or provided shelter only at calving. They planned to have calves born on pasture.

Fourteen farmers bred their cows to calve before April. Most of them had good shelter for calving. Early calving enabled these farmers to reduce beef chores when crop work started. Time of calving did not have a significant effect on return over all costs.

The practices farmers followed in handling their calves in the fall varied. Seventeen farmers did not separate their calves from the herd in the fall; they let the calves nurse until they weaned themselves. Most of these farmers planned to hold their calves for another season of grazing and sell them as yearling feeders.

The practice of not separating calves from the cow herd was most common among farmers with small herds. Many farmers felt that it was not worth while for them to separate calves because they had so few. Other farmers did not separate calves because they lacked facilities to handle weaned calves.

Seventy-seven farmers did separate their calves from the cow herd in the fall. Of this group, 35 separated the calves from the cows in November. This was usually the same time the cow herd was taken off pasture. Farmers said this practice disturbed the cow herd only once.

Time of separating the calves did not have a significant effect on return over all costs. However, this does not mean that weaning weights per calf had no effect on return over all costs, because the time of separation and weaning weights were not necessarily correlated. Some calves separated before November weighed as much as calves separated during or after November.

Thirty-one of the 77 farmers who separated their calves from the cow herd kept them on the farm. A few of these farmers fed their calves a high grain ration and sold them as finished cattle weighing 1000 to 1100 pounds. The rest of the farmers fed a high forage ration and sold calves as feeder cattle weighing 700 to 800 pounds. Most farmers who sold feeder cattle did

not produce enough grain on their farms to finish the calves.

Forty-six of the 77 farmers who separated their calves from the herd sold them at weaning time. Eighteen of these sold directly to cattle feeders who put them into feed lots (table 4). Some of these farmers advertised calves for sale in a newspaper or made sales through personal contacts. Almost one-third of these farmers sold to cattle buyers and another third sold their calves in the South St. Paul market. It was not possible with this small sample and the differences in quality of calves on the different farms to evaluate the differences in prices paid in these markets.

Table 4. Method of selling calves according to herd size.

Method of selling calves	Small herds	Medium herds	Large herds	All herds
	(number of herds)			
Direct to cattle feeder	3	7	8	18
Direct to cattle buyer	7	6	2	15
Direct to South St. Paul	1	10	2	13

Most of the farmers with larger herds sold recently weaned calves directly to feeders. Some of these farmers produced enough calves to enable a cattle feeder to obtain all the calves he wanted from one farmer. Farmers with the medium or small herds usually sold to South St. Paul or to cattle buyers. These herds were not large enough to justify a cattle feeder coming to the farm to buy calves.

In general, the various management practices considered in this study did not show a significant relationship to return over all costs per cow. However, this probably is due to the small sample used. A larger sample or controlled experiments might show different results.

Resources Used

When studying the information in the following section, one should remember that the input-output figures presented represent approximately average management efficiency. Not all farmers are going to operate at the level of efficiency shown in this bulletin but the figures presented provide a basis on which to plan the beef enterprise. Farmers operating at other levels of efficiency will need to adjust the input-output figures to fit their own situations.

Feed

The length of the winter feeding season for most beef cow herds was about six months. The winter feeding period usually started around November 1 and ended May 1. The major feed fed during the winter was alfalfa hay (table 5). In addition, about one-half of the farmers fed silage to their cows.

The total acres of land required to maintain a beef cow depends on the quality of the land and on how efficient the farmer is in managing his herd and crop enterprises. For example, farmers in Northeastern Minnesota harvested about two tons of hay per acre. Using this as a starting point, the number of acres required to provide hay (or the equivalent of hay and silage) for a beef cow managed under average efficiency is about 1.5 acres (table 6). In addition, another four acres of land is required when non-tillable open pasture is used. The land required to produce the corn and small grain fed is so small that it can be ignored. Thus, under the above conditions, total acreage required to maintain one beef cow is 5.5 acres.

Land requirements change as crop yields, management efficiency, and kind of pasture used vary. For example, only 2.3 acres are required when the farmer uses tillable pasture and manages his herd with the same efficiency as that

achieved by the one-fifth of the farmers with the lowest feed cost. Or, if a farmer uses non-tillable open pasture and manages his herd with the same efficiency as did the farmers with the highest total feed cost, then nine acres of land is required per cow. The least costly combination of land use depends on the relative prices of tillable and non-tillable pasture land.

Table 5. Feed used per cow*

Kind of feed	All herds	One-fifth of herds with lowest feed cost	One-fifth of herds with highest feed cost
Roughage, lbs.			
Hay	4528	2994	6674
Silage	4040	2716	4125
Total roughage [‡]	5875	3899	8049
Concentrates, lbs.			
Corn	73	20	231
Small grain	91	20	259
Supplement	20	7	18
Total concentrates	184	47	508
Non-tillable open pasture, ⁺ acres	4.0	2.5	5.0

* Includes cow, 1/6 replacement heifer and 1/25 bull.

[‡] Silage converted into hay equivalents (3 pounds of silage equals one pound of hay).

⁺ One acre of non-tillable open pasture equals .5 acre of tillable pasture.

Table 6. Acres required per beef cow.

Type of land	All herds	One-fifth of herds with lowest feed cost (acres)	One-fifth of herds with highest feed cost
Hay land	1.5	1.0	4.0
Non-tillable open pasture land	4.0	2.5	5.0
Total land	5.5	3.5	9.0
Hay land	1.5	1.0	4.0
Tillable pasture land	2.0	1.3	2.5
Total land	3.5	2.3	6.5

Buildings

Practices farmers followed in providing shelter for their beef cows depended somewhat on the buildings available and on the farmers' personal preferences. Farmers who did not provide shelter for their cows for the full year felt that weather conditions in the winter were not severe enough to justify the cost of providing shelter. Some farmers who were providing shelter for their cows for the full year expressed this same opinion. They stated that shelter would not be provided for the beef cow herd if it were not presently available on the farm. Many of the farmers were using buildings for shelter that had originally been constructed for some enterprise other than beef.

The most commonly used type of shelter was a building open on one or more sides--in most cases this was a cattle shed. The next most common type of shelter used was the closed shelter--usually a converted dairy barn (table 7).

Thirteen farmers provided shelter for their beef cows only at calving time. This was usually a simple shelter and only large enough to care for part of the herd at one time. In most instances, farmers had a well drained lot where beef cows that had calved could be held.

Table 7. Practice followed in providing shelter for beef cow herds.

Practice followed	Small herds	Medium herds	Large herds	All herds
	(number of herds)			
Shelter provided for full year:				
Building open on one or more sides	10	14	19	43
Closed building	14	7	5	26
Shelter provided at calving only	5	5	3	13
No shelter provided	3	6	3	12

Twelve farmers provided no shelter. These farmers found it necessary to provide cows with some protection from the wind and a good place to lie down.

Most farmers used well sodded lots or pastures with good windbreaks or ravines that were protected by trees. Heavy wet snows and late springs were the greatest hazards to these herds. The practice of providing shelter did not have any significant effect on profitability.

The amount of shelter provided on these farms was:

Small herd (15 - 40 cows)	60 sq. ft. per cow
Medium herd (14 - 70 cows)	50 sq. ft. per cow
Large herd (over 70 cows)	35 sq. ft. per cow

On the average, this came close to the recommendation of 50 square feet that is frequently made. The small herds were provided more space because it was available on the farm. Large herds, in many instances, were provided with less shelter than was recommended because herd size had expanded and farmers felt that all cows could be sheltered during periods of adverse weather even though they would be slightly crowded.

What would be the probable cost of housing a beef cow if new shelter were to be constructed? A pole shed provides adequate shelter for beef cows. A structure of this type costs \$1.00 to \$1.25 per square foot. Assuming 50 square feet of space is provided per cow, the investment in shelter is about \$50 to \$60 per cow. Annual costs (depreciation, interest, taxes, and repairs) run about 10 percent of total investment, or \$5 to \$6 per cow. If hay storage is provided for part of the hay, building investment per cow is higher. Assuming storage is provided for one ton of hay, building investment is \$15 to \$20 more per cow. Total building investment per cow, then, is \$65 to \$80.

Equipment

Total investment per cow in equipment varied by size of herd. The average investment per cow for all herds was \$12, with \$15, \$11, and \$10 for small, medium, and large herds respectively. Annual cost of equipment is

about 15 percent of total investment.

Common items of equipment used with the beef cow herd were hay feeders, salt and mineral feeders, cattle oilers, squeeze chutes, loading chutes, and corrals.

Labor

Labor used per cow varied with the size of the beef cow herd. As herd size increased, the hours of labor per cow decreased (table 8). Some jobs--climbing up and down from the hay loft or silo or hooking up the tractor to the spreader--required the same amount of time for any size herd. Thus, as herd size increased, the amount of fixed labor per cow decreased and this had the effect of lowering labor per cow for larger herds.

The job that required the most time was feed handling. Feed handling time included regular chores--feeding hay, silage, grain and supplement--and varied considerably among individual farms. Convenient arrangement of buildings and lots made feed handling easier on some farms.

Table 8. Hours of labor used per cow.

Job	Small herds	Medium herds	Large herds
	(hours of labor per cow)		
Feed handling	8.6	5.7	3.9
Cleaning and bedding	1.5	.8	.6
Calving	2.0	1.7	1.4
Miscellaneous*	<u>4.3</u>	<u>2.6</u>	<u>1.9</u>
Total hours	16.4	10.8	7.8

* Includes fencing, checking, dehorning and castrating.

Distribution of labor throughout the year was about the same for any size herd. About 40 percent of the labor was required in the winter, 30 percent in the spring, 10 percent in the summer, and 20 percent in the fall.

Livestock Investment

Investment in livestock was about \$200 per cow. This figure included one cow, approximately one replacement heifer for every six cows, and one bull for every 25 cows. Interest costs were equal to \$12 (6 percent of \$200).

Miscellaneous Costs

Miscellaneous costs averaged \$4 per cow for all herds. These costs included veterinary expenses, marketing expenses, electricity and insurance.

Beef Produced

These farmers produced .85 weaned calves (or calves of weaning age) per cow. Of these, .17 of a calf per cow was retained for replacement of the cow herd, leaving .68 to be sold. Weaning weight averaged 415 pounds. If all calves were sold at weaning, the average production of marketable calves would be 282 pounds (.68 x 415) per cow. In addition, there would be an annual sale of .17 of a 900 pound cow, or 153 pounds of cull beef.

Estimating Profitability of the Beef Cow Herd

The gross return per cow in Northeastern Minnesota under average conditions was not sufficient to cover all costs of production (table 9). The estimated market value of all resources used was \$112, or \$10 more than the gross return. However, this fact does not necessarily mean that beef cow herds should not be kept on some farms.

One factor affecting the decision to keep a beef cow herd is the fact that it can give some return for resources that might not otherwise have a market. For example, most of the feed used for the beef cow herd is pasture and hay--the most common types of crops raised in Northeastern Minnesota. There are few other good alternatives for farm land in this area.

According to the figures in table 9, costs other than feed (including labor) under average conditions were about \$45. Thus, the beef herd gave a return to feed of \$57; this is 85 percent of the value that could be obtained by those farmers who did have a ready market for their hay and pasture. (Market value for pasture and "other feed" is $\$11.75 + \$55.00 = \$66.75$, and 85 percent of this amount is \$57.)

Similarly, part-time farmers may look upon beef herds as a means of marketing labor which otherwise would be idle and buildings and some equipment may be on the farm without a good alternative use. Under these conditions, a beef cow herd may be profitably maintained as long as costs directly associated with the beef cow enterprise are covered.

Farmers purchasing all resources used will have to manage their beef cow herds with better than average efficiency to realize a profit. However, if they can achieve the same efficiency as that achieved by the one-fifth most profitable herds (table 9), they can cover all costs and receive about \$3 per hour for labor used with the beef cow herd.

Where Do Beef Cow Herds Fit?

Beef cow herds would certainly fit well on many farms if the herds are managed with better than average efficiency. Although this study does not define clearly the management factors that lead to high efficiency, other studies show that the following are among the most important: percent calf crop weaned, weight of calf at weaning, annual cost for the beef cow herd operation, and price received for beef produced. The level of efficiency that a farmer achieves for any one of these factors will affect the level of efficiency that is needed in the other factors for the beef cow herd to cover all costs. A farmer may not need to be above average in efficiency in all

Table 9. Profitability of beef cows under different levels of management efficiency.

Item	All herds	One-fifth most profitable herds
Weaning weight (pounds)	415	410
Calf crop weaned (percent)	85	89
Cow replacement rate (percent)*	17	17
Gross returns per cow:		
Calf sales [‡]	\$75.60	\$79.65
Cull cow sales [#]	<u>26.35</u>	<u>26.35</u>
Gross returns per cow	\$101.95	\$106.00
Costs per cow:		
Pasture	\$11.75	\$12.75
Other feed (mainly hay and silage)	55.00	36.00
Buildings and equipment	9.75	8.00
Direct variable costs [‡]	<u>20.00</u>	<u>20.00</u>
Total costs	\$96.50	\$76.75
Return to labor and management	\$ 5.45	\$29.25
Labor @ \$1.25 per hour ^{!!}	\$15.00	\$12.50
Total all costs	\$111.50	\$89.25
Return over all costs	\$-9.55	\$16.75
Feeder calf breakeven price needed with:		
No charge for labor	\$25.05	\$17.10
With labor charge of \$1.25 per hour	\$30.40	\$21.30

* Assumed the same for both levels of efficiency.

[‡] (Weaning weight x percent calf crop weaned - replacement rate) x average price of \$27.00 per cwt. existing for feeder calves in Kansas City for the 8 years of 1959-1966.

[#] (900 pound cow x replacement rate) x (average price of \$17.00 per cwt.)

[‡] Includes interest, depreciation on bull, and miscellaneous costs.

^{!!} Average of 12 hours per cow for all herds and 10 hours for the one-fifth most profitable herds.

of these production factors, but it will be necessary for him to be above average in some if the beef cow herd is going to pay market prices for all resources used.

Beef cow herds might also be profitably maintained on farms where the beef cow herd does not have to pay market prices for all resources used. This is the case on farms that have resources for which there is no alternative use that will return market value. Many farms in Northeastern Minnesota have buildings for which there may be no or little alternative use. Many farms in that area are well suited to hay and pasture but the market for these crops is limited. The same situation exists for farmers having unused labor available. Many people in that area live on farms but hold non-farm jobs. Almost one-half of the farmers interviewed were part-time farmers. A beef cow herd can be profitably maintained on these farms as long as it pays all the cash costs associated with it.